



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/718,607

11/24/2003

Hideaki Yoshida

60188-719

1705

7590

02/24/2006

Jack Q. Lever, Jr.
McDERMOTT, WILL & EMERY
600 Thirteenth Street, N.W.
Washington, DC 20005-3096

EXAMINER

TRINH, MICHAEL MANH

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/718,607

Applicant(s)

YOSHIDA, HIDEAKI

Examiner

Michael Trinh

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5 and 11-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5 and 11-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2822

DETAILED ACTION

*** This office action is in response to Applicant's Amendment filed December 09, 2005.

Claims 1-2,5,11-16 are pending.

*** The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

1. Claims 1,5,12,13 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al (6,191,038).

Yoshida teaches a chemical mechanical polishing method using a chemical mechanical polishing apparatus comprising: a polishing table 104 including a rotation mechanism (Figs 1, 3-5; col 7, line 21 through col 12); a polishing pad 103 attached on the polishing table; a substrate carrier 102 for holding a member to be polished, the substrate carrier including a rotation mechanism and a pressurization mechanism; a dresser 107 including a rotation mechanism and a pressurization mechanism; a detector 109 for detecting a state of a surface of the polishing pad 103 (col 7, lines 21-67); and a controller 110 for controlling a pressure to be applied by the dresser based on a signal from the detector, the method comprising the steps of: detecting the state of the surface of the polishing pad using the detector 109; controlling the pressure to be applied by the dresser 107 using the controller 110; dressing the polishing pad with the dresser coming in contact with the polishing pad 103; and polishing the member 101 to be polished using the polishing pad 103 (col 7, line 21 through col 8; col 9, line 19 through col 12). Re claims 5 and 12, wherein the step (c) and the step (d) are carried out simultaneously (col 10, lines 34-40; Figs 3-5; col 7, line 21 through col 10). Re claim 13, wherein the detector 109 measures a rotational torque of the dresser (col 7, lines 50-57; col 8, lines 22-46; col 10, lines 30-56).

Claim Rejections - 35 USC § 103

2. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al (6,191,038) taken with Homma et al (6,561,875).

Yoshida teaches a chemical mechanical polishing method using a chemical mechanical polishing apparatus as applied to claims 1,5,12,13 above.

Yoshida lacks teaching a dressing pressure of 18 to 40 g/cm².

However, Homma teaches (at Figs 1a-1b; col 7, line 65 through col 8) bringing the dresser 16 into contact with the polishing pad 11 by initially applying a dressing pressure of 30 g/cm², wherein the pressure is also to 20 g/cm² to the dresser to dress the polishing pad 11.

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to select the portion of the prior art's range of dressing pressure of about 30 g/cm², as taught by Homma, which is within the range of applicant's claims, because of the desirability to polish a substrate to form a planar surface, wherein it has been held to be obvious to select a value in a known range by optimization for the best results, and would be an unpatentable modification, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". *In Re Aller* 104 USPQ 233,255 (CCPA 1955); *In re Waite* 77 USPQ 586 (CCPA 1948); *In Re Swanson* 56 USPQ 372 (CCPA 1942); *In Re Sola* 25 USPQ 433 (CCPA 1935); and *In Re Dreyfus* 24 USPQ 52 (CCPA 1934).

3. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al (6,191,038) taken with James (6,454,634) and Pierce (WO 00/30159).

Yoshida teaches a chemical mechanical polishing method using a chemical mechanical polishing apparatus as applied to claims 1,5,12,13 above.

Yoshida lacks mentioning polishing pad having a surface roughness of 6µm to 8µm.

However, James teaches (at col 2, lines 6-30) using of a polishing pad having a surface roughness of about 1 to about 9µm (col 2, lines 11-12), wherein in one embodiment roughness of polishing pad can be up to 7 microns (col 2, lines 23). Pierce also teaches (at page 5, lines 10-20) to employ a polishing pad having an average roughness of less than 6 microns, and a root mean square roughness of less than 7 microns.

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to select the portion of the prior art's range of roughness of polishing pad of about 1 to about 9µm, or be up to 7 microns, as taught by James, and the teaching of Pierce for employing a polishing pad having an average roughness of less than 6 microns, and a root mean square roughness of less than 7 microns, which is within the range of applicant's claims, because of the desirability to polish a substrate to form a planar

Art Unit: 2822

surface, wherein it has been held to be obvious to select a value in a known range by optimization for the best results, and would be an unpatentable modification, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation". *In Re Aller* 104 USPQ 233,255 (CCPA 1955); *In re Waite* 77 USPQ 586 (CCPA 1948); *In Re Swanson* 56 USPQ 372 (CCPA 1942); *In Re Sola* 25 USPQ 433 (CCPA 1935); and *In Re Dreyfus* 24 USPQ 52 (CCPA 1934).

4. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al (6,191,038) taken with Fisher, Jr et al (6,186,864) and Amartur (6,812,478).

Yoshida teaches a chemical mechanical polishing method using a chemical mechanical polishing apparatus as applied to claims 1,5,12,13 above.

Yoshida already teaches using torque detector to detect the roughness surface of the polishing pad. Claim 14 recites using a laser light detector for detecting reflected intensity. Claim 15 recites using an electromagnetic wave detector for detecting reflected intensity or travel time (claim 16).

Fisher teaches (at Figs 1-2; col 7, lines 9-15; 28-67; col 8, lines 1-65) using electromagnetic sensors for detecting and measuring a travel time of reflected wave propagating back to the detector from the pad surface (col 7, lines 37-61), wherein a signal is sent to controller for pad conditioning according to the measurement. Amartur teaches (at col 3, lines 23-44)) using a laser source or using a light source in a range of electromagnetic spectrum for detecting intensity of reflected wave propagating back to the detector from the roughness surface so that the state of the roughness surface is determined.

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the state of the roughness surface of the polishing pad of Yoshida by employing electromagnetic sensors for detecting and measuring the travel time of reflected wave propagating back to the detector from the pad surface, and employing laser and electromagnetic wave sources for detecting intensity of reflected wave propagating back to the detector from the roughness surface, as combinatively taught by Fisher and Amartur. This is because of the desirability to accurately measure and detect the condition of the polishing pad so that the pad conditioning by the dresser can be

Art Unit: 2822

carried out and performed in an effective manner, thereby maintaining the polish pad uniformity, wherein these detecting and measuring optical techniques are alternative and art recognized equivalent techniques for detecting, measuring, and determining the current condition of the polishing pad in an accurate manner.

Response to Amendment

5. Applicant's remarks with respect to pending claims have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 9:00 Am to 5:30 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The central fax phone number is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Oacs-17


Michael Trinh
Primary Examiner